

REMARKS

Reconsideration and further examination of the subject patent application in light of the present Amendment and Remarks is respectfully requested. Claims 1-25 are currently pending in the application and stand rejected. No new matter has been added.

Rejection Under 35 U.S.C. §102

Claims 1, 2, 7-9, 13, 14, and 19-21 stand rejected under 35 U.S.C. §102 as being anticipated by Suh (2003/0219244). In view of the remarks, applicant respectfully traverses this rejection.

Claim 1 recites various structures, including a lens 16 and a lens frame 17, which supports the lens. The lens frame 17 includes hanger shaft hole 19. A chassis 3 includes an integrally formed hanger shaft 12. The hanger shaft 12 fits into the hanger shaft hole 19 to support the lens frame 17 so that the lens frame can reciprocally move relative to the chassis. The hanger shaft 12 has a plurality of outside diameters (Figs. 4-7) which correspond to inside diameters in the hanger shaft hole. Thus, the hanger shaft 12 having multiple outside diameters, fits within the hanger shaft hole 19 having corresponding multiple inside diameters, and permits movement of the lens frame 17, and hence the lens itself 16, to achieve proper focusing of the lens. When the lens frame 17 moves (along the optical axis) relative to the chassis, the hanger shaft moves guideingly within the hanger shaft hole. Thus, hanger shaft essentially “guides” the lens frame via the hanger shaft hole.

Because of the configuration and fit of the hanger shaft 12 and corresponding hanger shaft hole 19, is possible to adjust the lens focus with a high degree of accuracy (specification, p.3, para. [0007]). The multi-diameter configuration of the shaft, with the smaller diameter located at its distal end, provides several advantages. First, it is easier to align the tip of the shaft

with the entrance of the hanger shaft hole, because it is smaller in diameter. Thus, the tip of the shaft can be quickly and positively inserted into the hanger shaft hole without regard to the general tilt angle of the lens frame 17 during assembly. Second, once the hanger shaft 12 is fully inserted into the hanger shaft hole 19, the wide diameter portion d_1 (Fig. 4) of the hanger shaft mates with the corresponding wide diameter portion d_3 (Fig. 4) of the hanger shaft hole. Similarly, the narrow diameter portion d_2 (Fig. 4) of the hanger shaft mates with the corresponding narrow diameter portion d_4 (Fig. 4) of the hanger shaft hole.

Generally, smaller diameter components can be formed or machined with greater tolerance and accuracy than corresponding components having a larger size. Thus, the wider diameter portions may provide strength and coarse adjustment capability, while the smaller diameter portions permit fine adjustment. This permits controlled and accurate movement of the lens frame 17 as the hanger shaft hole 19 moves relative to shaft 12 of the chassis 3. Accordingly, independent claim 1 clearly requires a multi-diameter shaft and a corresponding multi-diameter hole, which permit the lens frame 17 to move relative to the chassis 3. New claim 25 has similar limitations.

The Examiner cites the primary reference to Suh as having all of the elements of claim 1. However, Suh is clearly missing both the multi-diameter shaft and a corresponding multi-diameter hole, which permits the lens frame to reciprocally move along the optical axis where the hanger shaft moves guideingly within the hanger shaft hole. In that regard, applicant previously requested that the Examiner provide further clarification regarding the Examiner's reference to an unspecified structure in Suh purporting to support the rejection. The Examiner has provided such clarification in the subject Office Action in the form of a marked-up Figure 2 of Suh, for which the undersigned thanks the Examiner.

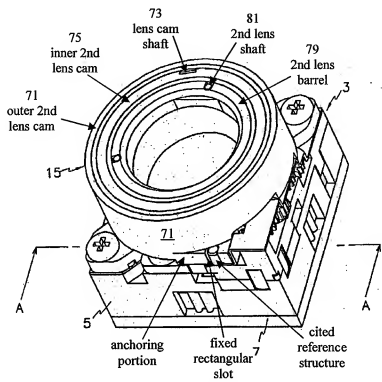
Because the Suh specification and drawings are somewhat difficult to follow, applicant has copied Figures 2, 5, 8, and 15 of Suh for purposes of discussion, which are shown below. The drawings include the undersigned's comments and reference numerals identifying the various structures by name in addition to the reference numeral.

The structure referred to by the Examiner in the Office Action as corresponding to applicant's hanger shaft has been labeled as the "cited reference structure" in the Suh figures. As shown in Figures 2 and 5, and in particular Figure 8, the "cited reference structure" is a projection or boss-like structure formed as part of the cover 31. The Examiner asserts that the "cited reference structure" includes two different diameters. Applicant cannot accurately discern this based on the drawings, but for purposes of discussion, let's assume the Examiner is correct with respect to this point.

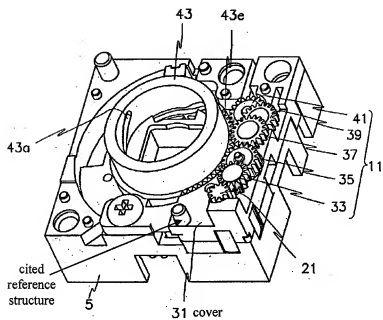
Turning now to the lens assembly, as shown clearly in Figure 2 of Suh, the outer 2nd lens cam 71 is formed as a thin cylindrical shell that includes an "anchoring portion" formed on its lower rim, which extends slightly outwardly from the circumference of the structure. The "anchoring portion" includes a "fixed rectangular slot" in which the "cited reference structure" is secured. These structures named by the undersigned are important to the discussion at hand.

The outer 2nd lens cam 71 is fixedly coupled to the base 5 by a screw (Suh, ¶[0059]). It does not rotate nor does it move in an axial or optical path direction. It is merely a fixed shell or housing that permits the 2nd lens barrel 79 to move axially within. The "cited reference structure" is not described nor identified in the specification, and appears to be a boss or projection that locks the outer 2nd lens cam 71 in place. Although the specification mentions that the outer 2nd lens cam 71 is held in place with screws (Suh, ¶[0059]), perhaps the "cited reference structure", which is bounded or held within the "fixed rectangular slot" shown in Figure 2, prevents any

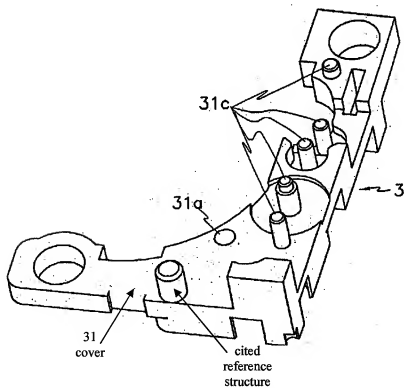
torquing or minute jittering of the outer 2nd lens cam 71. The “cited reference structure” may also merely act as a centering post or alignment post useful during initial assembly of the lens structure.



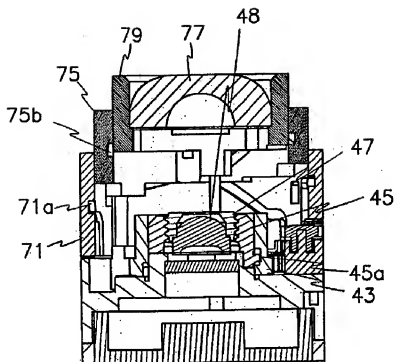
SUH FIGURE 2 (MARKED-UP)



SUH FIGURE 5 (MARKED-UP)



SUH FIGURE 8 (MARKED-UP)



SUH FIGURE 15 (MARKED-UP)

Of course, this is somewhat speculative because the Suh specification does not shed any light on the function of the “cited reference structure”. However, what is not speculation is that the outer 2nd lens cam 71 does not move relative to the cover 31 or any other structure. Clearly, the “cited reference structure” is not received into any aperture or hole as is applicant’s hanger shaft 12. In fact, the top or distal end of the “cited reference structure” is plainly shown in Figure 2 of Suh and only has a length sufficient to be received into the “fixed rectangular slot” in the “anchoring portion.” Because the outer 2nd lens cam 71 is fixed, there is nothing that can move relative to the “cited reference structure”. As such, the “cited reference structure” is very different than applicant’s hanger shaft 12 because as claimed, the hanger shaft 12 “moves guideingly within the hanger shaft hole.” In Suh, there is no multi-diameter shaft of any kind that

guides another structure, such as applicant's claimed lens frame 17 with corresponding hanger shaft hole 19. In other words, Suh discloses no shafts having multiple diameters and corresponding shafts holes that permit two components to move relative to each other along the optical axis.

In contrast in Suh, the only structure that moves relative to another structure is the 2nd lens barrel 79, and this structure is guided by two shafts 81, which have a uniform diameter. Similarly, the and first lens barrel 45 is guided by two shafts 57 shown in Figure 7 of Suh. Accordingly, regardless of whether the "cited reference structure" has multiple diameters (as suggested by the Examiner) or only has a single diameter, the "cited reference structure" does not and cannot facilitate movement of another component in a guidingly manner because the 2nd lens barrel 79 is a completely fixed structure.

Thus, Suh is completely missing applicant's claimed feature of a hanger shaft having a plurality of diameters, and where the hanger shaft moves guidingly within the hanger shaft hole when the lens frame moves relative to the chassis. Because these elements are completely missing in Suh, applicant submits that Suh cannot anticipate applicant's claimed invention. Applicant further submits that the dependent claims are allowable as depending from allowable base claims, respectively.

Rejection Under 35 U.S.C. §103

Claims 1-24 stand rejected under 35 U.S.C. §103 as being unpatentable over Suh in view of various combinations to Tereda (2005/0185951), Hayakawa (7,206,109), Johnson (5,861,564), and Kanno (5,712,734). In view of the remarks, applicant respectfully traverses this rejection. Applicant reasserts the above argument set forth under §102 to traverse the rejection under §103. None of the cited secondary references provide the elements missing from Suh, such as the guide

shafts having multiple diameters and the corresponding hanger shaft hole that permit two structures to move relative to each other in a guidingly manner. Combining Suh, which lacks any teaching or suggestion of guide shafts having multiple diameters and the corresponding hanger shaft holes, with any of the secondary references, which similarly lack such teaching or suggestion, fails to yield applicant's claimed invention. Accordingly, applicant submits that the cited references, either individually or in combination, do not render applicant's claimed invention obvious.

Summary

Pending claims 1-25 are believed to be patentable. Applicant respectfully requests the Examiner grant early allowance of this application. The Examiner is invited to contact the undersigned attorneys for the applicant via telephone if such communication would expedite this application.

Respectfully submitted,



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